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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte KRESIMIR MIHIC, DAVID VENGEROV, and ANDREW VAKHUTINSKY

Appeal 2016-005917
Application 13/332,721
Technology Center 3600

Before JAMES R. HUGHES, ERIC S. FRAHM, and NORMAN H. BEAMER, *Administrative Patent Judges*.

HUGHES, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants[1] seek our review under 35 U.S.C. § 134(a) of the Examiner's final decision rejecting claims 1, 3–8, 10–15, and 17–21. Claims 2, 9, and 16 have been canceled. Final Act. 1–2.[2] We have jurisdiction under 35 U.S.C. § 6(b).

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[1] The real party in interest is Oracle International Corporation. App. Br. 2.

[2] We refer to Appellants' Specification ("Spec.") filed Dec. 21, 2011; Appeal Brief ("App. Br.") filed Sept. 24, 2015; and Reply Brief ("Reply Br.") filed May 16, 2016. We also refer to the Examiner's Answer ("Ans.") mailed Mar. 17, 2016, and Final Office Action (Final Rejection) ("Final Act.") mailed Apr. 9, 2015.

We affirm.

Appellants' Invention

The invention generally relates to computer-readable media, price optimization systems, and methods for determining a pricing of items. The method includes receiving an initial price for a group of items (a set of prices or "price vector"), receiving an objective function comprising the revenue or margin for each item, and determining a new price vector by randomly choosing a set of allowed prices for the items which improves the objective function (exploiting the existing price vector) and assigning the allowed prices as the current price vector. The method also includes determining a second new price vector by randomly choosing a second set of allowed prices for the items that does not decrease the objective function by more than a predetermined value (exploring the current price vector), assigning the second set of allowed prices as the current price vector, sequentially repeating the exploiting and exploring until a terminating criteria is reached. Spec. ¶¶ 1, 4, 8, 9, 13; Abstract.

Representative Claim

Independent claim 1, reproduced below, further illustrates the invention:

> 1. A non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, cause the processor to determine pricing of a plurality of items, the pricing determination comprising:
>
> receiving an initial price vector for the items and assigning the initial price vector as a current price vector, wherein the initial price vector comprises a set of prices for each of the items;
>
> receiving an objective function, wherein the objective function comprises at least revenue or margin;

> determining a first new price vector by exploiting the current price vector, wherein the exploiting comprises randomly choosing a first set of allowed prices for the items, and when the first set of allowed prices improves the objective function, assigning the first set of allowed prices as the current price vector, wherein when the objective function is revenue or margin, an increase in objective function improves the objective function;
>
> determining a second new price vector by exploring the current price vector after the determining the first new price vector, wherein the exploring comprises randomly choosing a second set of allowed prices for the items, and when the second set of allowed prices does not decrease the objective function by more than a predetermined value, assigning the second set of allowed prices as the current price vector; and
>
> sequentially repeating the exploiting and exploring until a terminating criteria is reached, wherein when the terminating criteria is reached, the current price vector is the determined pricing of the plurality of items;
>
> wherein the exploiting further comprises, for a set of allowed prices for an item *i*, finding a price *p* that maximizes a value of the objective function, forming a new price vector by setting the price of item *i* to *p*, repeating the finding the price *p* for additional items *i*, and determining if the number of items with prices that differ from original values is greater than a predetermined maximum.

Rejections on Appeal

1. The Examiner rejects claims 1, 3–8, 10–15, and 17–21 under 35 U.S.C. § 101 as being directed to patent ineligible subject matter.

2. The Examiner rejects claims 1, 3–8, 10–15, and 17–21 under 35 U.S.C. § 103(a) as being unpatentable over Orcun Molvalioglu et al., *The interacting-particle algorithm with dynamic heating and cooling*, J. Glob. Optim., 43:329–356 (2009) ("Molvalioglu") and Boyd et al. (US 2005/0256778 A1, published Nov. 17, 2005) ("Boyd").

ISSUES

Based upon our review of the record, Appellants' contentions, and the Examiner's findings and conclusions, the issues before us follow:

1. Did the Examiner err in rejecting claims 1, 3–8, 10–15, and 17–21 under 35 U.S.C. § 101 as being directed to patent ineligible subject matter?

2. Did the Examiner err in finding that Molvalioglu and Boyd collectively would have taught or suggested "sequentially repeating the exploiting and exploring until a terminating criteria is reached, wherein when the terminating criteria is reached, the current price vector is the determined pricing of the plurality of items" wherein "the exploring comprises randomly choosing a second set of allowed prices for the items" that "does not decrease the objective function by more than a predetermined value" and wherein

> the exploiting . . . comprises, for a set of allowed prices for an item *i*, finding a price *p* that maximizes a value of the objective function, forming a new price vector by setting the price of item *i* to *p*, repeating the finding the price *p* for additional items *i*, and determining if the number of items with prices that differ from original values is greater than a predetermined maximum

(claim 1) within the meaning of Appellants' claim 1 and the commensurate limitations of Appellants' claims 8 and 15?

ANALYSIS

The 35 U.S.C. § 101 Rejection

Appellants argue independent claims 1, 8 and 15 together as a group with respect to the § 101 rejection. *See* App. Br. 3–9. We select

independent claim 1 as representative of Appellants' arguments with respect to claims 1, 3–8, 10–15, and 17–21. 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner rejects the claims as being directed to patent ineligible subject matter in that "the claims are directed to the abstract idea of . . . price optimization using randomized search" and the claims "do not include additional elements that are sufficient to amount to significantly more than the judicial exception because they recite only the use of a generic computer performing generic computing tasks" (Final Act. 2). *See* Ans. 2–6. Appellants contend that claims are not directed to an abstract idea because "a comparison of the alleged abstract idea of 'computer modeling and data analysis, specifically price optimization using randomized search' to the abstract ideas identified by the courts shows that there are **no similarities**" (App. Br. 4). *See* App. Br. 3–4; Reply Br. 2–3. Appellants further contend that "the claims can include an 'inventive concept' or additional elements so that the abstract idea is transformed into a patent-eligible application" (App. Br. 5). *See* App. Br. 5–9; Reply Br. 4.

Under 35 U.S.C. § 101, a patent may be obtained for "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." The Supreme Court has "'long held that this provision contains an important implicit exception: Laws of nature, natural phenomena, and abstract ideas are not patentable.'" *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 134 S. Ct. 2347, 2354 (2014) (quoting *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2116 (2013)).

The Supreme Court, in *Alice*, reiterated the two-step framework previously set forth in *Mayo Collaborative Services v. Prometheus*

Laboratories, Inc., 566 U.S. 66, 77–80 (2012), "for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts." *Alice*, 134 S. Ct. at 2355. The first step in that analysis is to "determine whether the claims at issue are directed to one of those patent-ineligible concepts" (*id.*), e.g., to an abstract idea. If the claims are not directed to an abstract idea, the inquiry ends. Otherwise, the inquiry proceeds to the second step where the elements of the claims are considered "individually and 'as an ordered combination' to determine whether the additional elements 'transform the nature of the claim' into a patent-eligible application." *Alice*, 134 S. Ct. at 2355 (quoting 566 U.S. at 78, 79).

The Court acknowledged in *Mayo*, that "all inventions at some level embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas." *Mayo*, 566 U.S. at 71. We, therefore, look to whether the claims focus on a specific means or method that improves the relevant technology or are instead directed to a result or effect that itself is the abstract idea and merely invoke generic processes and machinery. *See Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1336 (Fed. Cir. 2016).

Turning to the first step of the eligibility analysis, the Examiner finds claim 1 is directed to the abstract idea of optimizing the price of items using a randomized search. *See* Final Act. 2. The Examiner further explains that the claims are similar to claims previously found to be directed to abstract ideas. *See* Ans. 2–4. Conversely, the Appellants simply attack the Examiner's findings, alleging the Examiner has not properly mapped the abstract concept to specific precedent, without actually addressing any of the Examiner's findings. *See* App. Br. 3–4; Reply Br. 2–3. We agree with the

Examiner that Appellants' claim 1 (and the other pending claims) are directed to a patent-ineligible abstract idea.

Instead of using a fixed definition of an abstract idea and analyzing how claims fit (or do not fit) within the definition, "the decisional mechanism courts now apply is to examine earlier cases in which a similar or parallel descriptive nature can be seen — what prior cases were about, and which way they were decided." *Amdocs (Isr.) Ltd. v. Openet Telecom, Inc.*, 841 F.3d 1288 (Fed. Cir. 2016) (citing *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353–54 (Fed. Cir. 2016). As part of this inquiry, we must "look at the 'focus of the claimed advance over the prior art' to determine if the claim's 'character as a whole' is directed to excluded subject matter." *Affinity Labs. of Texas, LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1257 (Fed. Cir. 2016).

Here, Appellants' claims generally, and independent claims 1, 8, and 15 in particular, relate to determining optimized pricing utilizing sequential randomized searching (randomized search phases — exploiting and exploring). *See* Spec. ¶ 8. This is consistent with how Appellants describe the claimed invention. *See* Spec. ¶¶ 8, 13. Contrary to Appellants' assertions the present claims are analogous to a number of cases in which courts have identified similar claims as encompassing abstract ideas (*see* App. Br. 4; Reply Br. 2) and delineating this underlying abstract concept does not "generaliz[e] the alleged abstract idea at such a high level (i.e., 'computer modeling and data analysis') that it no longer has **ANY** relationship to the recited limitations" (Reply Br. 2).

Our reviewing court has held that abstract ideas include price optimization. *See OIP Techs., Inc. v. Amazon.com, Inc.*, 788 F.3d 1359

(Fed. Cir. 2015) (finding claims directed to price optimization on a generic computer to be an abstract idea). Additionally, our reviewing court has held that the collection, analysis, and manipulation of information (data) (e.g., recognizing certain data within the dataset) are also abstract ideas. *See Elec. Power*, 830 F.3d at 1354; *see also Content Extraction & Transmission LLC v. Wells Fargo Bank, N.A.*, 776 F.3d 1343, 1347 (Fed. Cir. 2014).

Here, the determination of optimized pricing for items is similar to the abstract idea of price optimization (*OIP Techs.*) and collecting, analyzing, and manipulating information (i.e., prices) and comparing values (i.e., a mathematical function) to predetermined values (as discussed in *Elec. Power*). Thus, we agree with the Examiner that the claims are directed to an abstract idea of determining optimized pricing utilizing sequential randomized searching. Notably, this characterization is consistent with Appellants' description of the claimed invention. *See* Spec. ¶¶ 8, 13.

Having found Appellants' claims are directed to an abstract concept under Alice's step 1 analysis, we next address whether the claims add significantly more to the alleged abstract idea. As directed by our reviewing Court, we search for an "'inventive concept' sufficient to 'transform the nature of the claim into a patent-eligible application.'" *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1312 (Fed. Cir. 2016) (quoting *Alice*, 134 S. Ct. at 2355). The implementation of the abstract idea involved must be "more than performance of 'well-understood, routine, [and] conventional activities previously known to the industry.'" *Content Extraction & Transmission LLC v. Wells Fargo Bank, N.A.*, 776 F.3d 1343, 1347–48 (Fed. Cir. 2014).

Here, the Examiner found that Appellants' claims do not add significantly more. *See* Final Act. 2; Ans. 4–6. Appellants, on the other hand, contend the claims "include an 'inventive concept' or additional elements so that the abstract idea is transformed into a patent-eligible application" (App. Br. 5; *see* App. Br. 5–9; Reply Br. 4) because (1) "the present claims recite functionality that goes well beyond the mere concepts of simply retrieving, comparing and combining data using a computer" (App. Br. 6; *see* App. Br. 5–6); (2) the claims "do not attempt to preempt every application of the alleged abstract idea of 'computer modeling and data analysis, specifically price optimization using randomized search'" (App. Br. 7; *see* App. Br. 6–7); and (3) "the recited claims provide improvements to the functioning of the computer" similar to the claims in *DDR Holdings* (App. Br. 8; *see* App. Br. 7–8).

With respect to Appellants' preemption arguments, "[w]hile preemption may signal patent ineligible subject matter, the absence of complete preemption does not demonstrate patent eligibility." *FairWarning IP, LLC v. Iatric Sys., Inc.*, 839 F.3d 1089, 1098 (Fed. Cir. 2016) (quoting *Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015)); *see also OIP Techs.*, 788 F.3d at 1362–63 ("[T]hat the claims do not preempt all price optimization or may be limited to price optimization in the e-commerce setting do not make them any less abstract."). Further, "[w]here a patent's claims are deemed only to disclose patent ineligible subject matter under the Mayo framework, as they are in this case, preemption concerns are fully addressed and made moot." *Ariosa*, 788 F.3d at 1379.

With respect to Appellants' *DDR Holdings* arguments, Appellants misconstrue *DDR Holdings*. In *DDR Holdings*, the court held that a claim may amount to more than any abstract idea recited in the claims when it addresses and solves problems *only* encountered with computer technology and online transactions, e.g., by providing (serving) a composite web page rather than adhering to the routine, conventional functioning of Internet hyperlink protocol. *See DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1257–59 (Fed. Cir. 2014). In contrast, claim 1 performs a process that collects, analyzes, and manipulates information (prices) to determine optimized pricing (an optimized pricing vector) (data structure) utilizing a conventional computer. *See* Final Ans. 2–4; Spec. ¶¶ 1, 4, 8, 9, 13, 25, 26, 33, 45, 46, 51, 52; *cf.* App. Br. 5–8; Reply Br. 4. The collection (searching), analysis, and manipulation of prices (data) are not technical problems as discussed in *DDR*, they are pricing and/or efficiency problems (whether random searching of prices meets certain criteria). Determining optimized pricing is a commercial solution to the pricing/efficiency problem, not a technical solution. This commercial solution may be assisted using a general purpose computer to perform the data collection, analysis, and manipulation processes, but does not arise specifically in the realm of computer networking or improve how the computer itself functions. As we previously explained, the instant claims are more akin to the claims for analyzing information found to be abstract in *OIP Techs.*, 788 F.3d at 1363 or *Elec. Power*, 830 F.3d at 1353.

We agree with the Examiner that the additional limitations, separately, or as an ordered combination, do not provide meaningful limitations (i.e., do not add significantly more) to transform the abstract idea into a patent

eligible application. *See e.g.*, Final Act. 2. Indeed, the claim merely recites processes for optimizing pricing, e.g., utilizing database and mathematical operations. Such steps are all routine and conventional and well-understood computer functions (i.e., mathematical operations) of a general processor. The Specification supports this view in discussing the processes implemented in software which operates on generic computers to perform the recited data manipulation steps. *See* Spec. ¶¶ 14–17. "[T]he use of generic computer elements like a microprocessor" to perform conventional computer functions "do not alone transform an otherwise abstract idea into patent-eligible subject matter." *FairWarning IP, LLC v. Iatric Sys., Inc.*, 839 F.3d 1089, 1096 (Fed. Cir. 2016) (citing *DDR Holdings*, 773 F.3d at 1256).

Moreover, we find this type of activity, i.e., receiving, collecting, processing, analyzing, and manipulating pricing data to determine optimized pricing includes longstanding conduct that existed well before the advent of computers and the Internet, and could be carried out by human thought alone or by a human with pen and paper. *See CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1375 (Fed. Cir. 2011) ("That purely mental processes can be unpatentable, even when performed by a computer, was precisely the holding of the Supreme Court in *Gottschalk v. Benson*").[3]

For at least the reasons above, we are not persuaded of Examiner error in the rejection of claim 1 under 35 U.S.C. § 101. Thus, we sustain the Examiner's rejection under § 101 of independent claims 1, 8, and 15, and

[3] *Cybersource* further guides that "a method that can be performed by human thought alone is merely an abstract idea and is not patent-eligible under § 101." *Cybersource*, 654 F.3d at 1373.

also dependent claims 3–7, 10–14, and 17–21, which fall with claims 1, 8, and 15, respectively.

The 35 U.S.C. § 103(a) Rejection

Appellants argue independent claims 1, 8 and 15 together as a group with respect to the § 103(a) rejection. *See* App. Br. 9–12. We select independent claim 1 as representative of Appellants' arguments with respect to claims 1, 3–8, 10–15, and 17–21. 37 C.F.R. § 41.37(c)(1)(iv).

The Examiner rejects independent claim 1 as being obvious in view of Molvalioglu and Boyd. *See* Final Act. 3–5; Ans. 6–14. Appellants contend Molvalioglu and Boyd do not teach the disputed features of claim 1. *See* App. Br. 9–12. Specifically, Appellants contend the Examiner "improperly glosses over" (App. Br. 10) the recited claim features and does not sufficiently map the disputed claim limitations to the cited prior art. *See* App. Br. 9–12; Reply Br. 4–6. The Examiner repeats the language of the claim and cites multiple disparate portions of Molvalioglu and Boyd as teaching the recited limitations. *See* Final Act. 3–5; Ans. 6–14. While the Examiner does provide a detailed chart purported mapping limitations of claim 1 to Molvalioglu, the Examiner does not sufficiently explain how the disclosures of Molvalioglu teach or suggest the disputed claim features.

Appellants persuade us of error in the Examiner's obviousness rejection. The Examiner provides no clear mapping or explanation between the disputed claim limitations and disclosures of Molvalioglu and Boyd. Further, the cited portions of Molvalioglu appear to conflate the various processes recited in Appellants' claim 1. *See, e.g.*, Ans. 8–9; De La Huerga p. 331 (N-Particle Exploration utilized for both exploiting and exploring limitations).

Consequently, we are constrained by the record before us to find that the Examiner erred in finding Molvalioglu and Boyd teach the disputed limitations of Appellants' claim 1. Independent claims 8 and 15 include limitations of commensurate scope. Dependent claims 3–7, 10–14, and 17–21 depend on claims 1, 8, and 15, respectively, and stand with their respective independent claims. Accordingly, we reverse the Examiner's obviousness rejection of claims 1, 3–8, 10–15, and 17–21.

CONCLUSIONS

Appellants have not shown that the Examiner erred in rejecting claims 1, 3–8, 10–15, and 17–21 under 35 U.S.C. § 101.

Appellants have shown that the Examiner erred in rejecting claims 1, 3–8, 10–15, and 17–21 under 35 U.S.C. § 103(a).

Because we have affirmed at least one ground of rejection with respect to each claim on appeal, the Examiner's decision is affirmed. *See* 37 C.F.R. § 41.50(a)(1).

DECISION

We affirm the Examiner's rejection of claims 1, 3–8, 10–15, and 17–21.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED